IGRINS-2 SV Observation Evaluation Form

Title: High Resolution NIR observations of HAeBe stars
Program ID: GN-2024A-SV104
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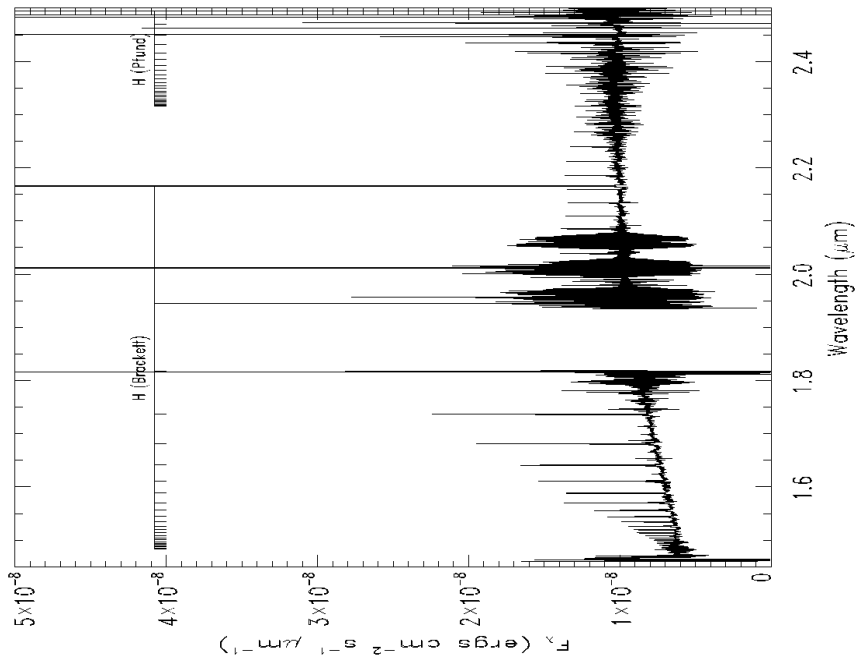
Description of the primary goals and the main findings

We wished to obtain high S/N (~100) H and K band spectra of a small sample of bright HAeBe stars in order to measure the strengths of the atomic and molecular emission lines arising from the ionized regions in these systems. We were particularly interested in the 2.3 micron CO 2-0 and 3-1 bandhead emission, models of which can yield the physical properties of the accretion disks. We were also hoping to take advantage of the high resolution afforded by IGRINS-2 to search for weak absorption lines arising from the underlying stellar source. This will allow us to classify the sources directly, rather than relying on arguments dependent on estimates of the bolometric flux or the SED. One of our sources (MWC 297; B1.5Ve) was observed during the SV period and the H and K band spectra are shown below.



IGRINS-2 spectrum of the HAeBe star MWC 297

Additional comments on IGRINS-2 performance:

Results of any other IGRINS-2 capability tested and comparison with other instruments

The spectra of MWC 297 obtained with IGRINS-2 exhibit a number of issues. The instrument produces spectra for which the intensities in successive K band orders do not match at the wavelengths where they overlap. Also, the edges of the spectra in each order exhibit prominent noise spikes. Furthermore, the spectra in the individual K band orders exhibit unphysical slopes. In addition, the noise at the longer wavelengths in the K band spectrum was much greater than expected and completely obscured the weak CO bandhead feature we were targeting. These problems greatly limit the usefulness of the data obtained.

Suggestions for improvements:

Any comments on ITC, PIT, OT, data reduction pipeline, website, archive, etc…

The pipeline reduction worked reasonably well. However, the telluric correction provided by the pipeline was insufficient for our purposes, as it left a large number of very strong residuals in the spectra which hindered line identifications and measurements. Furthermore, the pipeline does not produce flux-calibrated spectra. We developed our own telluric correction and flux calibration code to overcome these shortcomings.

Any additional comments about IGRINS-2 SV

Having the opportunity to use IGRINS-2 and reduce data with the pipeline was greatly appreciated. However, I feel there was far too much emphasis on the science that could come out of the SV observations and not enough of a focus on the instrument, the various tools, the data reduction pipeline, and how each of these elements performed. The SV effort should not be centered on the science that can be done, in my opinion, but rather on whether everything in the system is working well and as expected. In the case of IGRINS-2, I have found that the instrument is definitely not performing as it should.